

**Amendments to the Claims:**

The following claims will replace all prior versions of the claims in this application (in the unlikely event that no claims follow herein, the previously pending claims will remain):

1. (Original) A method of preparing a porphyrin derivative starting from a meso-substituted porphyrin compound, characterized in that a meso-(2'-cyanovinyl)-substituted porphyrin compound of which the vinyl is optionally substituted is used as the meso-substituted porphyrin compound, wherein said meso-(2'-cyanovinyl)-substituted porphyrin compound, in a form in which its porphyrin macrocycle is complexed with a bivalent metal ion

i) is subjected to

an acid for which  $0 < \text{pKa} < 5$

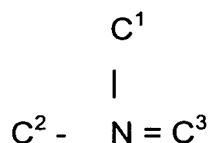
and

an oxidising agent,

with the restriction that if the carbon atom of the porphyrin macrocycle at which the (2'-cyanovinyl) substituent is attached is designated  $\text{C}\alpha$ , there must be a substituent attached to  $\text{C}\delta$ , counting along the perimeter of the porphyrin macrocycle, said substituent comprising a  $-\text{C}-\text{C}$  motif directly attached at the  $\text{C}\delta$  carbon atom;

or

ii) is subjected under aprotic conditions to a Vilsmeier reagent having a reactive motif



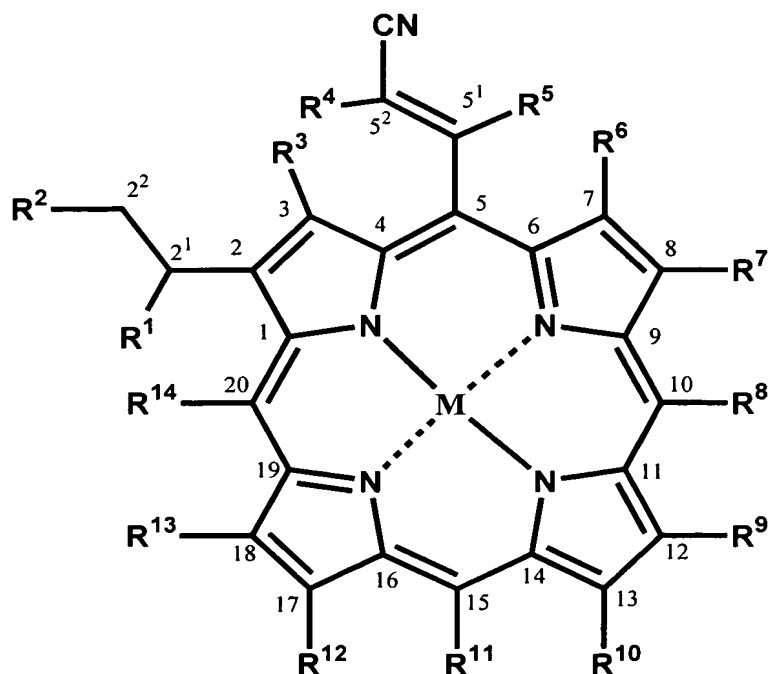
containing a quaternary nitrogen atom which is directly linked to two carbon atoms  $\text{C}^1$ ,  $\text{C}^2$  wherein said carbon atoms are not part of a unsaturated or aromatic moiety, and which quaternary nitrogen atom is directly linked to a

carbon atom C<sup>3</sup> via a double bond, said carbon atom C<sup>3</sup> carrying a halogen atom chosen from fluoro, chloro, bromo and iodo with the restriction that if the carbon atom of the porphyrin macrocycle at which the (2'-cyanovinyl) substituent is attached is designated C $\alpha$ , there must be a substituent attached to C $\delta$ , counting along the perimeter of the porphyrin macrocycle, said substituent comprising a –CH motif directly attached at the C $\delta$  carbon atom;

to convert said meso-(2'-cyanovinyl)-substituted porphyrin compound into a porphyrin derivative having a quinoline-ring system peri-condensed to the porphyrin ring, and optionally the bivalent metal ion is removed or replaced by another metal ion, and optionally the nitrogen atom of the quinoline-ring system ring is quaternized.

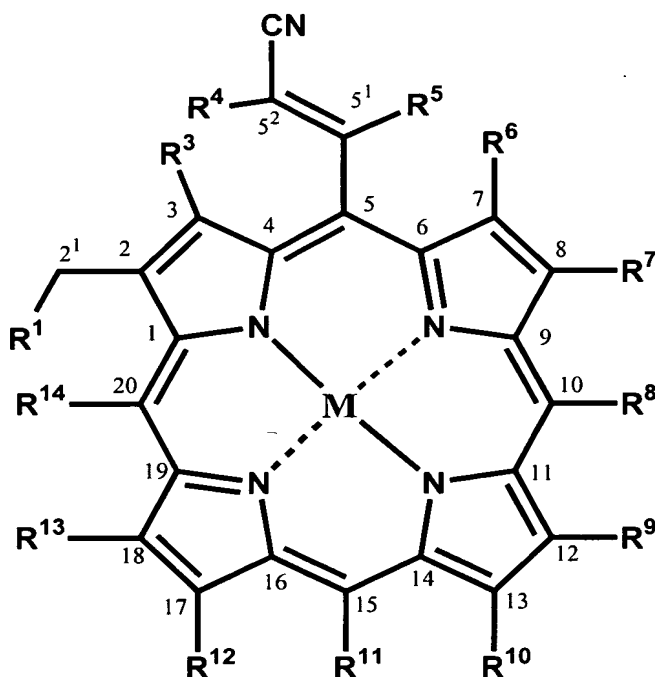
2. (Original) The method according to claim 1, characterized in that for alternative step i) a meso-(2'-cyanovinyl)-substituted porphyrin compound of formula (I) is used as the starting compound,

(I)



or wherein for alternative step ii) meso-(2'-cyanovinyl)-substituted porphyrin compound of formula (III) is used as the starting compound

(III)



wherein

$R^1$ ,  $R^2$  represent independently of each other hydrogen, linear or branched ( $C_{1-8}$ ) alkyl, or linear or branched ( $C_{1-8}$ )alkyl C(O)O ( $C_{1-8}$ )alkyl, wherein the groups comprising alkyl may optionally be substituted with fluoro, chloro, bromo, iodo, nitrile, ( $C_{1-8}$ ) thioether, and ( $C_{1-8}$ ) alkoxy;

$R^3$  represents H or ( $C_{1-8}$ ) alkyl;

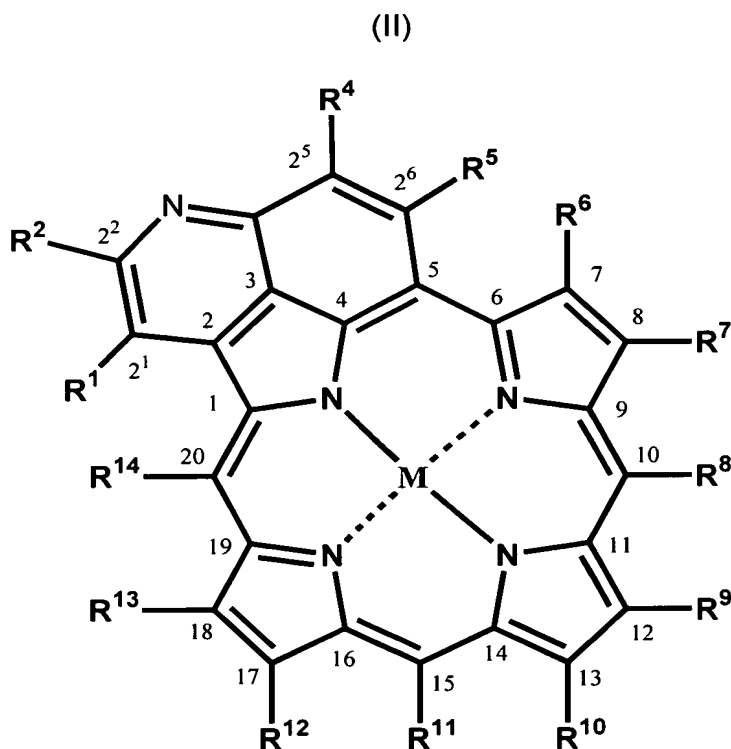
$R^4$  and  $R^5$ , represent, independently of each other, hydrogen, nitrile, monocyclic, bicyclic or tricyclic ( $C_{6-14}$ ) aryl, or ( $C_{1-4}$ ) alkyl wherein the aryl and alkyl group may optionally be substituted with fluoro, chloro, bromo, iodo, nitrile, ( $C_{1-8}$ ) thioether, and ( $C_{1-8}$ ) alkoxy;

$R^6$  to  $R^{14}$  represent independently of each other, hydrogen, linear or branched ( $C_{1-8}$ ) alkyl, linear or branched ( $C_{1-8}$ )alkyl C(O)O ( $C_{1-8}$ )alkyl, wherein n is an integer of

0 to 4,  $\text{CH}_2=\text{CH}-$ , a monocyclic, bicyclic or tricyclic ( $\text{C}_3\text{-C}_{14}$ ) aryl, which aryl may optionally contain one or more nitrogen atoms as heteroatoms; and  $\text{R}^8$ ,  $\text{R}^{11}$ , and  $\text{R}^{14}$  may in addition represent an acrylonitrile group substituted with  $\text{R}^{4'}$  and  $\text{R}^{5'}$ , wherein  $\text{R}^{4'}$  and  $\text{R}^{5'}$  are as defined for  $\text{R}^4$  and  $\text{R}^5$ ;

and

M represents a bivalent metal ion,  
wherein the compound of formula (I) or (III) is converted into the corresponding porphyrin derivative of formula (II) comprising a quinoline-ring system fused to the porphyrin ring



wherein the substituents have the meanings given above, and depending on the meaning of  $\text{R}^8$ ,  $\text{R}^{11}$ , and  $\text{R}^{14}$  and the correspondence of an adjacent  $\text{R}^7$ ,  $\text{R}^9$ ,  $\text{R}^{10}$ ,  $\text{R}^{12}$ , and  $\text{R}^{13}$  with  $\text{R}^3$  optionally more than one quinoline-ring system peri-condensed to the porphyrin ring is present.

3. (Currently amended) The method according to claim 1 or 2, characterized in that the nitrogen atom of the peri-condensed quinoline-ring system ring in formula (II) is quaternized.

4. (Currently amended) The method according to ~~any of the preceding claims~~ claim 1, characterized in that the meso-(2'-cyanovinyl)-substituted porphyrin compound is prepared by introducing a formyl or acetyl residue at a meso position of a porphyrin compound, whereafter the mesoformylporphyrin thus formed is converted into the meso-(2'-cyanovinyl) derivative.

5. (Original) The method according to claim 4, characterized in that the mesoformylporphyrin formed is converted into the meso-(2'-cyanovinyl)-substituted porphyrin compound by reaction with diethylphosphonoacetonitril.

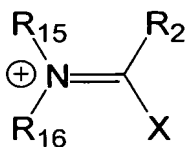
6. (Currently amended) The method according to ~~any of the preceding claims~~ claim 1, characterized in that the porphyrin starting compound for the preparation of the meso-(2'-cyanovinyl) porphyrin is chosen from the group of i) hemin, and ii) heme.

7. (Currently amended) The method according to ~~any of the preceding claims~~ claim 1, characterized in that  $\text{Ni}^{2+}$  is used as the bivalent metal ion.

8. (Currently amended) The method according to ~~any of the preceding claims~~ claim 1, characterized in that a Brönsted-acid is used with the proviso that  $0 < \text{pK}_a < 5$ , the reaction being carried out at a temperature above  $140^\circ\text{C}$ .

9. (Currently amended) The method according to ~~any of the claims 1 to 7~~ claim 1, characterized in that the Vilsmeier reagent used is of the formula (IV)

(IV)



wherein

R15 and R16 are, independently of each other, linear or branched C<sub>1-8</sub> alkyl,

X is fluoro, chloro, bromo and iodo, and

R2 is hydrogen, linear or branched (C<sub>1-8</sub>) alkyl, or linear or branched (C<sub>1-8</sub>)alkyl C(O)O (C<sub>1-8</sub>)alkyl, wherein the groups comprising alkyl may optionally be substituted with fluoro, chloro, bromo, iodo, nitrile, (C<sub>1-8</sub>) thioether, and (C<sub>1-8</sub>) alkoxy.

10. (Original) The method according to claim 9, characterized in that X is chloro or bromo.

11. (Original) Porphyrin derivatives, wherein said derivatives are:

- 2'-methoxycarbonylquino[4,4a,5,6-jkl]-annulated 12-demethyl-13-de[2-(methoxycarbonyl)ethyl]mesoporphyrin dimethylester;

- 2'-methoxycarbonylquino[4,4a,5,6-qrs]-annulated 18-demethyl-17-de[2-(methoxycarbonyl)ethyl]mesoporphyrin dimethylester;

- quino[4,4a,5,6-abt]-annulated 2-demethyl-3-deethylmesoporphyrin dimethylester;

- quino[4,4a,5,6-efg]-annulated 7-demethyl-8-deethylmesoporphyrin;

- 2'-methoxycarbonylquino[4,4a,5,6-jkl]-annulated 12-demethyl-13-de[2-(methoxycarbonyl)ethyl]mesoporphyrin;

- 2'-methoxycarbonylquino[4,4a,5,6-qrs]-annulated 18-demethyl-17-de[2-(methoxycarbonyl)ethyl]mesoporphyrin;

- quino[4,4a,5,6-abt]-annulated 2-demethyl-3-deethylmesoporphyrin;

- quino[4,4a,5,6-bcd]-2-demethyl-3-deethyl-mesoporphyrin dimethylester;

- quino[4,4a,5,6-bcd]-2-demethyl-3-deethyl-mesoporphyrin;

- 3'-methylquino[4,4a,5,6-efg]-7-demethyl-8-deethylmesoporphyrin dimethylester;

- 3'-methylquino[4,4a,5,6-efg]-7-demethyl-8-deethylmesoporphyrin;

- 9'-aminocarbonylquino[4,4a,5,6-efg]-7-demethyl-8-deethylquinoporphyrin dimethylester;

- 9'-aminocarbonylquino[4,4a,5,6-efg]-7-demethyl-8-deethylquinoporphyrin

- N-benzylquinolinium[4,4a,5,6-efg]-annulated mesoporphyrin dimethylester

- N-benzylquinolinium[4,4a,5,6-efg]-annulated mesoporphyrin.

12. (Original) A porphyrin derivative having a quinoline-ring system peri-condensed to the porphyrin ring.

13. (Original) Use of a porphyrin derivative according to claim 12 for the preparation of a pharmaceutical composition of a porphyrin derivative according to the invention for prevention of and/or treating

1) benign, malignant, inflamed and infectious skin and mucosa disorders:  
skin/mucosa disorders;

2) vascular disorders;

3) tumors and pre-cancerous lesions;

4) ophthalmology disorders;

5) gynecological or urological disorders;

6) immunological disorders;

7) oral cavity or nasopharyngeal disorders.

14. (Original) Use of a porphyrin derivative according to claim 12 for the preparation of a composition of a porphyrin derivative according to the invention for the preparation of a composition

1) for photodetection of malignant and pre-malignant lesions;

2) for decontamination or pathogen reduction of liquids such biological fluids and contaminated water;

3) for decontamination or pathogen reduction of surfaces;

4) for use as insecticide.

15. (Original) Pharmaceutical composition comprising a porphyrin derivative according to claim 12 together with a pharmaceutically acceptable carrier or excipient.